

# **Can the Paleoproterozoic Nagssugtoquidian Orogeny and Meso-Neoarchean North Atlantic Craton Geologic Boundary in Greenland be Traced Beneath the Ice Sheet Using Gravity and Magnetic Data?**

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Geological evidence of the terrane boundary between the Nagssugtoquidian Orogeny and the North Atlantic Craton is present in exposed rocks on both the east and west coasts of Greenland. The subglacial continuation of this boundary must be inferred from geophysical data across the Greenland ice sheet. Several possible locations have been suggested, based on combinations of regional grids of gravity and magnetic anomalies. We use high-resolution, flight-line profiles of gravity and magnetics data from Operation Ice Bridge (OIB) to investigate both the location and the nature of the boundary. We model the density and susceptibility contrasts associated with previously proposed locations of the terrane boundary (Dawes, 2009 and Henricksen et al., 2009), and find evidence for several additional boundaries with significant contrasts in geophysical properties. We present a series of profile models and map the most significant boundaries to reveal a more complex image of the subglacial geology beneath the Greenland ice sheet.